

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**SURFACE DRAINAGE**

**FIELD DITCH**

(ft)

**CODE 607**

**DEFINITION**

A graded ditch for collecting excess water in a field.

**SCOPE**

This standard applies to drainage ditches installed to collect water from a field. It does not apply to Surface Drainage, Main or Lateral (608) or to Grassed Waterways or Outlets (412).

**PURPOSE**

To drain surface depressions; collect or intercept excess surface water, such as sheet flow, from natural and graded land surfaces or channel flow from furrows and carry it to an outlet; and collect or intercept excess subsurface water and carry it to an outlet.

**CONDITIONS WHERE PRACTICE APPLIES**

Applicable sites are flat or nearly flat and:

1. Have soils that are slowly permeable (low permeability) or that are shallow over barriers, such as rock or clay, which hold or prevent ready percolation of water to a deep stratum.
2. Have surface depressions or barriers that trap rainfall.
3. Have insufficient land slope for ready movement of runoff across the surface.
4. Receive excess runoff or seepage from uplands.
5. Require the removal of excess irrigation water.
6. Require control of the water table.
7. Have adequate outlets available for disposal of drainage water by gravity flow or pumping.

**DESIGN CRITERIA**

Drainage field ditches shall be planned as integral parts of a drainage system for the field served and shall collect and intercept water and carry it to an outlet with continuity and without ponding.

**Investigations.** An adequate investigation shall be made of all sites.

**Location.** Ditches shall be established, insofar as topography and property boundaries permit, in straight or nearly straight courses. Random alignment may be used to follow depressions and isolated wet areas of irregular or undulating topography. Excessive cuts and the creation of small irregular fields shall be avoided.

On extensive areas of uniform topography, collection or interception ditches shall be installed as required for effective drainage.

**Design.** The size, depth, side slopes, and cross section area shall:

1. Be adequate to provide the required drainage for the site.
2. Permit free entry of water from adjacent land surfaces without causing excessive erosion.
3. Provide effective disposal or reuse of excess irrigation water (if applicable).
4. Conduct flow without causing excessive erosion.
5. Provide stable side slopes based on soil characteristics.
6. Permit crossing by field equipment if feasible.
7. Permit construction and maintenance with available equipment.

**Cross Section and Grade.** The cross section and grade of the ditches will vary with the use of the land, the crop, the direction of farming, and how

NRCS-Minnesota  
October 1999

the flow enters the ditch. An ideal layout on flat land is for each crop row to drain into a drainage field ditch. However, this requires that the ditch be crossed in practically all farming operations, which necessitates a larger cross-section than one not crossed and increases maintenance. Where farming operations are parallel with the ditches, a smaller section can be used.

	<b>Cropland &amp; Hayland</b>		<b>Pasture Land</b>
	<b>Ditch Crossed</b>	<b>Ditch Not Crossed</b>	
<b>Minimum bottom width</b>	6.0	6.0	4.0
<b>minimum depth (1)</b>	0.5 ft.	0.5 ft.	0.5 ft.
<b>side slopes</b>	8:1 or flatter (2)	4:1 or flatter	3:1 or flatter
<b>minimum grade</b>	0.05% (3)	0.05%	0.02%

(1) Minimum depth is measured below the low point in the area to be drained. This requirement is waived when the area to be drained is less than 0.5 acre.

(2) If the channel is adjacent and parallel to a property line or fence line, and the crop rows lead directly into it, the side slope adjacent to the boundary may be steepened to a stable slope.

(3) 0.1% is the minimum grade when the ditch is crossed by farming operations.

**Capacity.** The minimum capacity required will be based on the drainage curve designated for the area on drawing #3-N-45058, page 6-16 of the Minnesota Drainage Guide, except that curve 1 should be used through the state for pasture drainage. Capacity should be determined by Manning's Formula, with the hydraulic grade line at or below ground surface. The velocity at design capacity will not exceed the appropriate values given on page 6-5 of the Minnesota Drainage Guide. Applicable graphs and charts in the Guide may be used to select the proper size.

**Spacing.** As a general guide, the maximum length of grade draining into a field ditch should be 600 feet under typical surface drainage conditions.

Closer spacings should be used if required by site conditions or local common practice.

## PLANS AND SPECIFICATIONS

Plans and specifications for constructing drainage field ditches shall be in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.